

Claims

1. A vacuum assisted auto-lancing device, comprising:
a housing having a body, the body being partitioned
into a first chamber and a second chamber by a first
5 partition plate, with a lever hole provided on an outer
periphery of the first chamber at a position adjacent to a
first end of the first chamber, and a locking protrusion
vertically protruding from a position around the lever
hole;
- 10 an actuating lever, comprising:
an actuating switch seated on the lever hole, and
having at a lower portion thereof first and second
actuating steps which pass through the lever hole;
a switch cap covering the actuating switch; and
15 a switch cover locking the actuating switch and the
switch cap to a predetermined position of the body;
a holding unit, comprising:
a first stem coupled at a first end thereof to an
inner periphery of the first chamber, a second end of the
20 first stem being exposed to an outside of the first
chamber;
a second stem integrally coupled to the first end
of the first stem and placed in the first chamber; and
a stem cap to close a first end of the second stem;
25 a trigger comprising:

a first trigger unit disposed at a position in the first and second stems, and activated by the first actuating step, with a lancet holder holding a lancet and being secured to an end of the first trigger unit which
5 extends to the first stem; and

a second trigger unit rotatably mounted to cover both sides and a top of the second stem, and activated by the second actuating step;

a blood collecting unit, comprising:

10 an adjusting screw positioned at the first end of the first chamber and rotatably secured to the first stem;

an adjusting slider fastened to the adjusting screw; and

an end cap mounted to the first stem; and

15 a vacuum unit, comprising:

a plunger placed to reciprocate in the second chamber, and selectively passing through the first partition plate to engage with the second trigger unit; and

a body cap to lock the plunger to the second
20 chamber.

2. The vacuum assisted auto-lancing device according to claim 1, wherein the actuating switch is configured so that the second actuating step thereof is shorter in length than the first actuating step thereof, and a first vacuum
25 hole extends from an upper portion of the actuating switch

and passes between the first and second actuating steps,
and the switch cap is made of a flexible material to seal a
gap between the actuating switch and the outer periphery of
the body, with a second vacuum hole formed on an upper
5 surface of the switch cap to communicate with the first
vacuum hole, and the switch cover has at a central portion
thereof a through hole to allow the actuating switch
surrounded by the switch cap to pass through the switch
cover, with a plurality of locking recesses provided on a
10 lower surface of the switch cover to engage with the
locking protrusions.

3. The vacuum assisted auto-lancing device according
to claim 1, wherein the first partition plate has on a
central portion thereof a first spring mounting protrusion
15 protruding toward the second chamber, with a first guide
hole formed at a predetermined position on the first spring
mounting protrusion, and second guide holes formed on
opposite sides of the first guide hole, and a first
external threaded part is provided on an outer periphery of
20 a first end of the second chamber, and a first internal
threaded part is provided on the inner periphery of the
first chamber at a position adjacent to the first end of
the first chamber.

4. The vacuum assisted auto-lancing device according

to claim 3, wherein the holding unit further comprises:

a second external threaded part provided on an outer periphery of the first end of the first stem of the holding unit to correspond to the first internal threaded part;

5 a first O-ring mounted to a position around the second external threaded part to seal a gap between the inner periphery of the first chamber and an outer periphery of the first stem;

10 an annular groove provided at a position around the first O-ring;

a second O-ring fitted over the second end of the first stem that is exposed to an outside of the first chamber; and

15 a second partition plate integrally mounted to an inner periphery of the first end of the first stem, with a third guide hole formed at a central portion of the second partition plate, and a fourth guide hole provided above the third guide hole to extend to the inner periphery of the first stem.

20 5. The vacuum assisted auto-lancing device according to claim 4, wherein first guide rails are provided on upper and lower portions of the outer periphery of the first stem to extend from the first O-ring to the second O-ring, and a first guide groove is provided on an upper portion of the
25 inner periphery of the first stem to extend from a position

around the fourth guide hole to the second end of the first stem.

6. The vacuum assisted auto-lancing device according to claim 5, wherein the second stem comprises:

5 hinge shafts protruding from both side surfaces of the second stem, with a stopper protruding from a position under either of the hinge shafts;

 a first depression provided by vertically cutting out an upper portion of the second end of the second stem;

10 a second depression provided by horizontally cutting out a portion around the first depression; and

 locking holes provided on upper and lower portions of the first end of the second stem, a stem cap being mounted to the first end of the second stem and having the same
15 shape as the first end of the second stem, with a second spring mounting protrusion provided on a surface of the stem cap and locking steps provided on upper and lower portions of the stem cap to be fitted into the corresponding locking holes.

20 7. The vacuum assisted auto-lancing device according to claim 6, wherein the first trigger unit of the trigger comprises:

 a base plate vertically placed in the second stem, with a third spring mounting protrusion provided at a

central portion on a first surface of the base plate to face the second spring mounting protrusion and support a lancet spring;

5 a joint bar extending from a second surface of the base plate to a predetermined position to pass through the third guide hole, with a rebound spring fitted over the joint bar, and the lancet holder holding the lancet secured to an end of the joint bar which passes through the third guide hole; and

10 a lancet locking plate provided at an upper position on the second surface of the base plate to pass through the fourth guide hole and extend to the first guide groove, with a first trigger protrusion provided at an upper position of an end of the lancet locking plate and
15 selectively engaging with the second depression to be struck by the first actuating step.

8. The vacuum assisted auto-lancing device according to claim 6, wherein the second trigger unit comprises:

seesaw plates each having at a central portion
20 thereof a hinge hole to rotatably engage with the corresponding hinge shaft, with a first hook provided at a lower portion on a first side of the hinge hole of each of the seesaw plates, and an elastic piece provided at a lower portion on a second side of either of the seesaw plates to
25 be in close contact with an upper surface of the stopper;

a plunger locking plate coupling upper edges of the seesaw plates to each other, and seated in the first depression; and

5 a second trigger protrusion provided at an upper portion of the plunger locking plate to be struck by the second actuating step.

9. The vacuum assisted auto-lancing device according to claim 6, wherein the adjusting screw of the blood collecting unit has a shape of an annular ring, with a
10 depth adjusting internal threaded part provided on an inner periphery of the adjusting screw, and a plurality of rotary protrusions having hook shapes protruding radially to be rotatably fitted into the annular groove, and the adjusting
15 slider has a shape of an annular ring, with a depth adjusting external threaded part provided on an outer periphery of the adjusting slider to correspond to the depth adjusting internal threaded part, and second guide
20 grooves formed on upper and lower portions of an inner periphery of the adjusting slider to engage with the first guide rails, and the end cap has a shape of a cylinder which is opened at both ends thereof and tapered in a predetermined direction, with an upper portion of an inner periphery of the end cap coming into close contact with the second O-ring of the first stem.

10. The vacuum assisted auto-lancing device according to claim 9, wherein the end cap further comprises stabilizing protrusions which integrally extend inwards from both sides of a lower portion on the inner periphery of the end cap.

11. The vacuum assisted auto-lancing device according to claim 9, wherein the end cap is made of a transparent material to allow a user to observe collected blood, and a contact plate having a flange shape is integrally provided at an end of the end cap and radially extends outwards from the end of the end cap, the contact plate being curved upwards to be in close contact with a predetermined body site.

12. The vacuum assisted auto-lancing device according to claim 9, wherein the plunger of the vacuum unit has second guide rails on both sides of an outer periphery of the plunger, and an interior of the plunger is partitioned into a third chamber and a fourth chamber by a third partition plate, and a third O-ring is fitted over an end of the third chamber and is in close contact with the inner periphery of the second chamber, and mounting plates are provided on both sides of the end of the third chamber and horizontally extend to an outside of the third chamber, thus selectively passing through the second guide holes,

with a second hook provided on an upper end of each of the mounting plates to engage with the first hook, and a fourth spring mounting protrusion is provided in the third chamber and extends from the third partition plate to face the first spring mounting protrusion and support the plunger spring.

13. The vacuum assisted auto-lancing device according to claim 12, wherein the body cap is shaped so that a first end thereof is opened and a second end thereof is closed, the body cap comprising a plunger hole provided on the second end of the body cap to allow the plunger to move in and out of the body cap, third guide grooves provided on opposite side of the plunger hole to guide the second guide rails, and a second internal threaded part provided on an inner periphery of the body cap to engage with the first external threaded part.

14. The vacuum assisted auto-lancing device according to claim 12, wherein an end of the fourth chamber is closed by the plunger cap which is made of a flexible material, and a strip for testing blood glucose is placed in the fourth chamber which is closed by the plunger cap.